

# Activity Theory And Learning At Work

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## INTRODUCTION

Anna Sfard (1998) suggested two basic metaphors of learning compete for dominance today: the *acquisition* metaphor and the *participation* metaphor. The key dimension underlying Sfard's dichotomy is derived from the question: Is the learner to be understood primarily as an individual or as a community? This is an important dimension, largely inspired by the notion of community of practice put forward by Lave and Wenger (1991; Wenger, 1998). However, an attempt to construct a one-dimensional conceptual space for the identification, analysis and comparison of theories is bound to eliminate too much of the complexity of the field of learning. The potential and significance of cultural-historical activity theory in general and the theory of expansive learning (Engeström, 1987) in particular calls for a more multi-dimensional treatment (for a concise introduction to activity theory as a living movement, see Sannino et al., 2009).

To locate the theory of expansive learning more adequately in the conceptual field of learning theories, three additional dimensions may be usefully employed:

- 1 Is learning primarily a process that transmits and preserves culture or a process that transforms and creates culture?
- 2 Is learning primarily a process of vertical improvement along some uniform scales of competence or horizontal movement, exchange and hybridization between different cultural contexts and standards of competence?
- 3 Is learning primarily a process of acquiring and creating empirical knowledge and concepts or a

process that leads to the formation of theoretical knowledge and concepts?

The theory of expansive learning puts the primacy on communities as learners, on transformation and creation of culture, on horizontal movement and hybridization, and on the formation of theoretical concepts. This theory does not fit into either one of the two metaphors suggested by Sfard (1998). From the point of view of expansive learning, both acquisition-based and participation-based approaches share much of the same conservative bias, having little to say about transformation and creation of culture. Both acquisition-based and participation-based approaches depict learning primarily as one-way movement from incompetence to competence, with little serious analysis devoted to horizontal movement and hybridization. Acquisition-based approaches may ostensibly value theoretical concepts, but their very theory of concepts is quite uniformly empiricist and formal (Davydov, 1990). Participation-based approaches are commonly suspicious if not hostile toward the formation of theoretical concepts, largely because these approaches, too, see theoretical concepts mainly as formal 'bookish' abstractions.

So the theory of expansive learning relies on its own metaphor: expansion. The core idea is qualitatively different from both acquisition and participation. In expansive learning, learners learn something that is not yet there. In other words, the learners construct a new object and concept for their collective activity, and implement this new object and concept in practice. This shift in metaphors has been noted by Paavola et al. (2004) who suggest knowledge creation as a new, third

metaphor, and by Fenwick (2006b) who suggests participation, expansion, and translation as relevant alternative and complementary metaphors for theorizing work-based learning.

The theory of expansive learning was initially formulated some 20 years ago (Engeström, 1987). Especially in recent years, it has been used in a wide variety of studies and interventions. The topics range from adult mathematics learning in workplaces (FitzSimons, 2003) and hybrid educational innovations (Yamazumi, 2008) to the impact of ICT reforms on teacher education (Rasmussen and Ludvigsen, 2009). The theory has been used in studies of the development of a conflict-monitoring network (Foot, 2001) and multi-organizational change efforts in an industry (Hill et al., 2007). These studies also deal with learning in and for interagency working with youngsters at-risk of exclusion with special educational needs (Daniels, 2004), as well as with the uses of weblogs in e-learning (Makino, 2007), and learning among nurses and adult educators who function as 'portfolio professionals' contracting their services to multiple employers and organizations (Fenwick, 2004). The theory has been used as framework in a study of simulated clinical experience in university nursing education (Haigh, 2007), in a study of learning as boundary crossing in a school-university partnership (Tsui and Law, 2007), and in a study of promoting new types of transfer between school and workplace (Konkola et al., 2007). The work of Gutiérrez and her colleagues on expanded 'third spaces' for learning and literacy development has been influenced by the theory of expansive learning (Gutiérrez and Larson, 2007; Gutiérrez, 2008; Vossoughi and Gutiérrez, in press). Although necessarily incomplete, the list indicates that the theory of expansive learning has been found particularly useful in analyses of learning in non-traditional, hybrid multi-organizational and multi-cultural settings.

## SOCIETAL AND HISTORICAL DEMAND FOR A NEW KIND OF LEARNING

In *Learning by Expanding*, the emergence of expansive learning activity was seen as a consequence of historical transformations in work:

The increasingly societal nature of work processes, their internal complexity and interconnectedness as well as their massive volumes in capital and capacity, are making it evident that, at least in periods of acute disturbance or intensive change, no one actually quite masters the work *activity* as a whole, though the control and planning of the whole is formally in the hands of the management. This creates something that may be called

'grey zones', areas of vacuum or 'no man's land', where initiative and determined action from practically any level of the corporate hierarchy may have unexpected effects (Engeström, 1987, pp. 113–114).

The inner contradictions of capitalist production and organization of work have remained at the center of research on expansive learning. Many of these studies have been carried out within a research program called developmental work research (for earliest studies, see Engeström and Engeström, 1986 and Toikka et al., 1986). Most of these empirical studies and interventions have been conducted in workplace settings (for recent representative collections, see Engeström, 2005 and Engeström, Lompscher et al., 2005).

The basic argument is that traditional modes of learning deal with tasks in which the contents to be learned are well known ahead of time by those who design, manage and implement various programs of learning. When whole collective activity systems, such as work processes and organizations, need to redefine themselves, traditional modes of learning are not enough. Nobody knows exactly what needs to be learned. The design of the new activity (externalization) and the acquisition of the knowledge and skills it requires (internalization) are increasingly intertwined. In expansive learning activity, they merge (Engeström, 1999a).

Pihlaja (2005) adds to this argument the important aspect of historically changing types of generalizing in work processes. Generalization is at the root of learning. Generalization is based on identifying and mastering variation. In mass production, what needed to be mastered was variation in the ways different workers performed the same tasks. This led to standardization of key actions and action sequences. In flexible mass production or 'lean production', what needs to be mastered is variation in the form of deviations from an optimal streamlined process, that is, breaks, disturbances and waste. This leads to continuous process optimization.

Today the life cycles of entire product, production and business concepts are rapidly becoming shorter. Correspondingly, the rhythm of overall concept-level transformations is accelerated. In other words, what needs to be mastered is variation in the sense of constantly shifting product, production and business concepts. This is no longer achievable by means of technical optimization of isolated actions and processes. Accelerated concept-level changes in work and organizations require generalization and learning that expand the learners' horizon and practical grasp up to the level of collective activity systems.

There are two additional factors that add weight to the societal need for expansive learning. The first

one is the emergence and escalation of social production or peer production (Benkler, 2006) that utilizes the interactive potential of the Internet, or Web 2.0. This opens up a field of possibilities for the formation of new types of activities and use values with huge expansive potentials, such as Linux and Wikipedia.

The second factor is the emergence and increasing presence of global threats and risks, or 'runaway objects' (Engeström, 2008b), exemplified by global warming, new pandemic diseases and global financial disasters. This opens up a field of tremendous challenges for concept formation and practical redesign in a scale that has to exceed the boundaries of any single discipline, profession or organization.

### THEORETICAL ROOTS OF THE CONCEPT OF EXPANSIVE LEARNING

The theory of expansive learning builds on foundational ideas put forward by four key figures in Russian cultural-historical school: Vygotsky, Leont'ev, Il'enkov, and Davydov. Six ideas developed by these scholars form the conceptual basis of the theory of expansive learning. Two additional roots come from Bateson and Bakhtin. I will briefly characterize each of these eight roots.

(1) It may be argued that for Vygotsky, the unit of analysis was mediated action (Zinchenko, 1985). Leont'ev (1981) demonstrated how the emergence of division of labor within a community leads to the separation of action and activity. In a tribal hunt, for example, certain participants chase the game away, toward other participants who wait in ambush and kill the game. These two groups perform different actions (chasing, killing) in the collective activity of hunting. The half-life on an action is finite; an action has a definite beginning and an end. A collective activity, on the other hand, reproduces itself without a predetermined endpoint by generating seemingly similar actions over and over again. Yet there is continuous and at times dramatically discontinuous change in the activity. The very idea of expansive learning is built on this theoretically consequential *distinction between action and activity*. Expansive learning is movement from actions to activity.

The essence of [expansive] learning activity is production of objectively, societally new activity structures (including new objects, instruments, etc.) out of actions manifesting the inner contradictions of the preceding form of the activity in question. [Expansive] learning activity is *mastery of expansion from actions to a new activity*. While traditional

schooling is essentially a subject-producing activity and traditional science is essentially an instrument-producing activity, [expansive] learning activity is an *activity-producing activity* (Engeström, 1987, p. 125).

(2) Vygotsky's concept of the *zone of proximal development* is another important root of the theory of expansive learning. Vygotsky (1978, p. 86) defined the zone as '*the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers*.' In *Learning by Expanding*, Vygotsky's individually oriented concept was redefined to deal with learning and development at the level of collective activities:

It is the *distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated as a solution to the double bind potentially embedded in the everyday actions* (Engeström, 1987, p. 174).

In effect, the zone of proximal development was redefined as the space for expansive transition from actions to activity (Engeström, 2000).

(3) Being an application of activity theory, the theory of expansive learning is foundationally an *object-oriented theory*.

Properly, the concept of its object (*Gegenstand*) is already implicitly contained in the very concept of activity. The expression 'objectless activity' is devoid of any meaning. (...) the object of activity is two-fold: first, in its independent existence as subordinating to itself and transforming the activity of the subject; second, as an image of the object, as product of its property of psychological reflection that is realized as an activity of the subject(...) Leont'ev (1978, p. 52).

In other words, the object is both resistant raw material and the future-oriented purpose of an activity. The object is the true carrier of the motive of the activity. Thus, in expansive learning activity, motives and motivation are not sought primarily inside individual subjects – they are in the object to be transformed and expanded. As Leont'ev (1978, p. 186) pointed out, motives cannot be taught, they can only be nurtured by developing 'the content of actual vital relations' of the learners. Expansive learning is a process of material transformation of vital relations.

(4) Activity theory is dialectical theory, and the dialectical concept of *contradiction* plays a crucial

part in it. Following Il'enkov (1977, 1982), the theory of expansive learning sees contradictions as historically evolving tensions that can be detected and dealt with in real activity systems. In capitalism, the pervasive primary contradiction between use value and exchange value is inherent to every commodity, and all spheres of life are subject to commoditization. This pervasive primary contradiction takes its specific shape and acquires its particular contents differently in every historical phase and every activity system. Most importantly, contradictions are the driving force of transformation. The object of an activity is always internally contradictory. It is these internal contradictions that make the object a moving, motivating and future-generating target. Expansive learning requires articulation and practical engagement with inner contradictions of the learners' activity system.

(5) Il'enkov's dialectics were powerfully translated into learning theory by Davydov (1990) whose theory of learning activity is based on the dialectical method of *ascending from the abstract to the concrete*. This is a method of grasping the essence of an object by tracing and reproducing theoretically the logic of its development, of its historical formation through the emergence and resolution of its inner contradictions. A new theoretical idea or concept is initially produced in the form of an abstract, simple explanatory relationship, a 'germ cell'. This initial abstraction is step-by-step enriched and transformed into a concrete system of multiple, constantly developing manifestations. In learning activity, the initial simple idea is transformed into a complex object, into a new form of practice. Learning activity leads to the formation of theoretical concepts – theoretically grasped practice – concrete in systemic richness and multiplicity of manifestations. In this framework, abstract refers to partial, separated from the concrete whole. In empirical thinking based on comparisons and classifications, abstractions capture arbitrary, only formally interconnected properties. In dialectical-theoretical thinking, based on ascending from the abstract to the concrete, an abstraction captures the smallest and simplest, genetically primary unit of the whole functionally interconnected system (see Il'enkov, 1977; Davydov, 1990; also Bakhurst, 1991; Falmagne, 1995).

Ascending from the abstract to the concrete is achieved through specific epistemic or learning actions. According to Davydov (1988, p. 30), an ideal-typical sequence of learning activity consists of the following six learning actions: (1) transforming the conditions of the task in order to reveal the universal relationship of the object under study, (2) modeling the identified relationship in

a material, graphic or literal form, (3) transforming the model of the relationship in order to study its properties in their 'pure guise', (4) constructing a system of particular tasks that are resolved by a general mode, (5) monitoring the performance of the preceding actions, (6) evaluating the assimilation of the general mode that results from resolving the given learning task. In the theory of expansive learning, Davydov's concept of learning activity is developed further, to deal with the challenges of learning outside the school and the classroom (see the next section).

(6) Vygotsky and his colleagues saw the essence of human psychological functioning in the mediation of action by means of cultural tools and signs. Traditional experimental methods largely excluded cultural mediation from their analyses. But the human subject always 'imports' into an experimental setting a set of psychological instruments in the form of signs that the experimenter cannot control externally in any rigid way (Van der Veer and Valsiner, 1991, p. 399).

The person, using the power of things or stimuli, controls his own behavior through them, grouping them, putting them together, sorting them. In other words, the great uniqueness of the will consists of man having no power over his own behavior other than the power that things have over his behavior. But man subjects to himself the power of things over behavior, makes them serve his own purposes and controls that power as he wants. He changes the environment with the external activity and in this way affects his own behavior, subjecting it to his own authority (Vygotsky, 1997, p. 212).

In other words, the subject's agency, his or her ability to change the world and his or her own behavior, becomes a central focus. Vygotsky built his interventionist methodology of *double stimulation* on this insight. Instead of merely giving the subject a task to solve, Vygotsky gave the subject both a demanding task (first stimulus) and a 'neutral' or ambiguous external artifact (second stimulus) the subject could fill with meaning and turn into a new mediating sign that would enhance his or her actions and potentially lead to reframing of the task. Expansive learning typically calls for formative interventions based on the principle of double stimulation (Engeström, 2007c).

(7) The theory of expansive learning also owes a great deal to the innovative thinking of the anthropologist Gregory Bateson (1972). His conceptualization of levels of learning, particularly the notion of *Learning III* and the associated concept of *double bind*, must be identified as the seventh

theoretical root of the theory of expansive learning. Bateson's *Learning III* is basically the same as expansive learning activity. Within the theory of expansive learning, Bateson's notion of double bind may be interpreted as 'a social, *societally essential dilemma which cannot be resolved through separate individual actions alone – but in which joint co-operative actions can push a historically new form of activity into emergence*' (Engeström, 1987, p. 165).

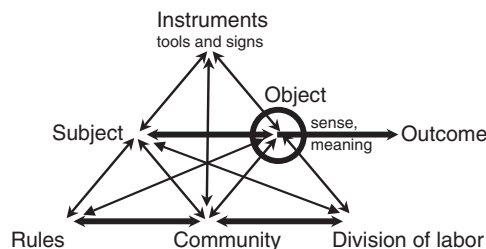
(8) Finally, Mikhail Bakhtin's (1982) idea of *multi-voicedness*, or heteroglossia, needs to be included among the roots of the theory of expansive learning. 'Applied in expansive learning and research, this means: *all the conflicting and complementary voices of the various groups and strata in the activity system under scrutiny shall be involved and utilized*. As Bakhtin shows, this definitely includes the voices and non-academic genres of the common people. Thus, instead of the classical argumentation within the single academic speech type, we get clashing fireworks of different speech types and languages' (Engeström, 1987, pp. 315–316). Expansive learning is an inherently multi-voiced process of debate, negotiation and orchestration.

## CENTRAL TENETS OF EXPANSIVE LEARNING

The theory of expansive learning focuses on learning processes in which the very subject of learning is transformed from isolated individuals to collectives and networks. Initially individuals begin to question the existing order and logic of their activity. As more actors join in, a collaborative analysis and modeling of the zone of proximal development are initiated and carried out. Eventually the learning effort of implementing a new model of the activity encompasses all members and elements of the collective activity system (see Figure 7.1).

The circle around the object in Figure 7.1 indicates at the same time the focal role and inherent ambiguity of the object of activity. The object is an invitation to interpretation, personal sense making and societal transformation. We need to distinguish between the generalized object of the historically evolving activity system and the specific object of as it appears to a particular subject, at a given moment, in a given action. The generalized object is connected to societal meaning, the specific object is connected to personal sense.

As activity systems are increasingly interconnected and interdependent, many recent studies of expansive learning take as their unit of analysis



**Figure 7.1 General model of an activity system (Engeström, 1987, p. 78)**

a constellation of two or more activity systems that have a partially shared object. Such interconnected activity systems may form a producer–client relationship, a partnership, a network, or some other pattern of multi-activity collaboration.

Obviously this kind of extension of the unit of analysis makes it more demanding to identify and give voice to the actual flesh-and-blood human subjects in each activity system. The theory of expansive learning cannot be reduced to the learning of abstract organizations without concrete human subjects. Movement between a system's view and a subject view is of crucial importance: 'The system view of an organization is blatantly insufficient when the researchers try to understand and facilitate qualitative changes by means of expansive learning. Changes must be initiated and nurtured by real, identifiable people, individual persons and groups. The interventionist researcher must find within the activity system flesh-and-blood dialogue partners who have their own emotions, moral concerns, wills and agendas. Organization must necessarily be translated back into a workplace inhabited by human beings' (Engeström and Kerosuo, 2007, p. 340).

Contradictions are the necessary but insufficient engine of expansive learning in an activity system. In different phases of the expansive learning process, contradictions may appear (a) as emerging latent primary contradictions within each and any of the nodes of the activity system, (b) as openly manifest secondary contradictions between two or more nodes (e.g., between a new object and an old tool), (c) as tertiary contradictions between a newly established mode of activity and remnants of the previous mode of activity, or (d) as external quaternary contradictions between the newly reorganized activity and its neighboring activity systems. Conflicts, dilemmas, disturbances and local innovations may be analyzed as manifestations of the contradictions.

Contradictions become actual driving forces of expansive learning when they are dealt with in such a way that an emerging new object is identified

and turned into a motive: 'the meeting of need with object is an extraordinary act' (Leont'ev, 1978, p. 54). The motive of collective activity becomes effective for an individual by means of personal sense: 'sense expresses the relation of motive of activity to the immediate goal of action' (Leont'ev, 1978, p. 171).

Expansive learning leads to the formation of a new, expanded object and pattern of activity oriented to the object. This involves the formation of a theoretical concept of the new activity, based on grasping and modeling the initial simple relationship, the 'germ cell', that gives rise to the new activity and generates its diverse concrete manifestations (Davydov, 1990). The formation of an expanded object and corresponding new pattern of activity requires and brings about collective and distributed agency, questioning and breaking away from the constraints of the existing activity and embarking on a journey across the uncharted terrain of the zone of proximal development (Engeström, 1996). In other words, the 'what' of expansive learning consists of a triplet: expanded pattern of activity; corresponding theoretical concept; and new type of agency.

Ascending from the abstract to the concrete is achieved through specific epistemic or learning actions. Together these actions form an expansive cycle or spiral. An ideal-typical sequence of epistemic actions in an expansive cycle may be described as follows (Engeström, 1999b, pp. 383–384):

- The first action is that of questioning, criticizing or rejecting some aspects of the accepted practice and existing wisdom. For the sake of simplicity, I will call this action *questioning*.
- The second action is that of *analyzing* the situation. Analysis involves mental, discursive or practical transformation of the situation in order to find out causes or explanatory mechanisms. Analysis evokes 'why?' questions and explanatory principles. One type of analysis is *historical-genetic*; it seeks to explain the situation by tracing its origins and evolution. Another type of analysis is *actual-empirical*; it seeks to explain the situation by constructing a picture of its inner systemic relations.
- The third action is that of *modeling* the newly found explanatory relationship in some publicly observable and transmittable medium. This means constructing an explicit, simplified model of the new idea that explains and offers a solution to the problematic situation.
- The fourth action is that of *examining the model*, running, operating and experimenting on it in order to fully grasp its dynamics, potentials and limitations.
- The fifth action is that of *implementing the model* by means of practical applications, enrichments, and conceptual extensions.

- The sixth and seventh actions are those of *reflecting on* and evaluating the process and *consolidating* its outcomes into a new stable form of practice.

These actions bear a close resemblance to the six learning actions put forward by Davydov (1988; see above). Davydov's theory is, however, oriented at learning activity within the confines of a classroom where the curricular contents are determined ahead of time by more knowledgeable adults. This probably explains why it does not contain the first action of critical questioning and rejection, and why the fifth and seventh actions, implementing and consolidating, are replaced by 'constructing a system of particular tasks' and 'evaluating' – actions that do not imply the construction of actual culturally novel practices.

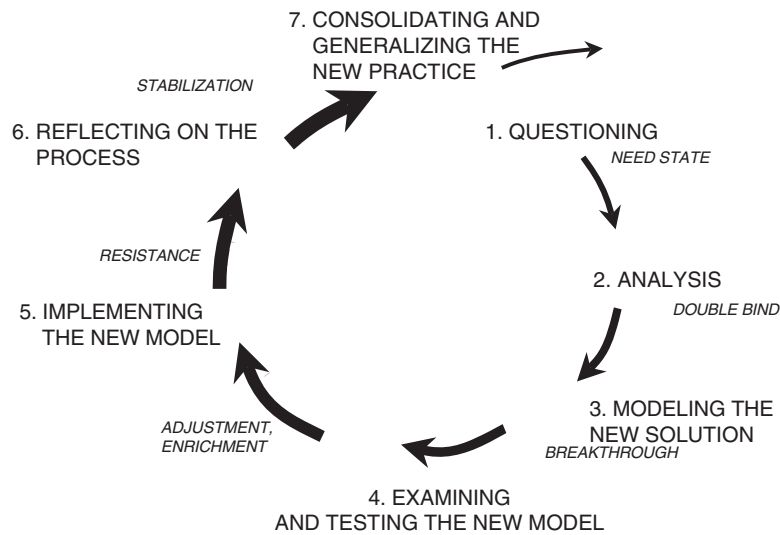
The process of expansive learning should be understood as construction and resolution of successively evolving contradictions. The entire ideal-typical expansive cycle may be diagrammatically depicted as in Figure 7.2. The thicker arrows indicate expanded scope of and participation in the learning actions. The cycle of expansive learning is not a universal formula of phases or stages. In fact, one probably never finds a concrete collective learning process which would cleanly follow the ideal-typical model. The model is a heuristic conceptual device derived from the logic of ascending from the abstract to the concrete. Every time one examines or facilitates a potentially expansive learning process with the help of the model, one tests, criticizes and hopefully enriches the theoretical ideas of the model.

The key ideas of the theory of expansive learning are enriched and developed further in empirical and interventionist studies. I will now examine a series of themes developed in such studies.

## EXPANSIVE LEARNING AS TRANSFORMATION OF THE OBJECT

Traditionally we expect that learning is manifested as changes in the subject, i.e., in the behavior and cognition of the learners. Expansive learning is manifested primarily as changes in the object of the collective activity.

In her study of teacher teams, Kärkkäinen (1999) analyzed changes in the object as qualitative *turning points*. She followed a primary school teacher team which embarked on a process of learning to design and execute new kinds of thematic curriculum units that cut across multiple school subjects, went beyond the physical boundaries of the classroom and the school, and lasted longer than the usual single lesson.



**Figure 7.2** Sequence of learning actions in an expansive learning cycle

Kärkkäinen analyzed the design and implementation of a thematic unit called 'Local Community'. The object evolved in three phases. The first four meetings of the teacher team produced the idea of the work on themes that cut across subjects. The next meetings produced a plan for the 'Local Community' theme. The final five meetings monitored the execution of the plan and evaluated the realization of both the specific theme and the work on themes more generally. Each turning point was characterized by clusters of discursive disturbances (misunderstandings, disagreements, conflicts, and minor dilemmas), phases of questioning, and concentrations of different voices or perspectives (Kärkkäinen, 1999, pp. 111–116). Moving through these phases and turning points, the object evolved from a general notion of cross-subject 'theme working' into a specific theme focused on the local community and finally into a relatively complex multifaceted constellation of the main theme and its sub-themes.

The expansion of the object proceeds in multiple dimensions. Engeström (2000) and Hasu (2000) identified four dimensions: the social-spatial ('who else should be included?'), the anticipatory-temporal ('what previous and forthcoming steps should be considered?'), the moral-ideological ('who is responsible and who decides?'), and the systemic-developmental ('how does this shape the future of the activity?'). Engeström, Puonti et al. (2003) compared three studies of expansive learning focusing on the socio-spatial dimension on the one hand and

the temporal dimension on the other hand. They concluded that space and time are not the whole story; there moral-ideological dimension of power and responsibility is always also at stake. This third dimension was discussed by Puonti (2004) in her study of the investigation of economic crimes:

A case under investigation consists of a constant interplay of the crime and its investigation. The case, however, is never merely unique: the crime under investigation constitutes a part of economic crime in general, and the investigation is part of economic crime prevention. The interplay between the crime and its investigation can be viewed at two levels: at the specific case level and at the general level. Expansion is a twofold movement: the crime is expanded by the criminal perpetrators, and the investigators have the opportunity to expand the object in their investigation. The self-movement of the object generates the *potential for expansion*, but the efforts to expand the object of investigation have remained insufficient. (...)

Expansion is commonly understood as positive development. My empirical setting, however, shows the dark side of expansion as well. It may be seen as a shift of a contradictory phenomenon from one developmental phase to another. There is a constant battle between the criminals and the authorities: Which side is able to move first to the next phase of development? The investigation is not merely in the hands of the investigators, but the crime 'strikes back' and forces the investigators to adopt new ways of action (Puonti, 2004, p. 82).

Puonti's observation is a useful reminder of the fact that expansion is not reducible to the efforts of learners aimed at emancipation and empowerment. Expansion is also generated from within the object, and it is never only a benign process.

### EXPANSIVE LEARNING AND THE ZONE OF PROXIMAL DEVELOPMENT

In the theory of expansive learning, criteria and yardsticks of learning are built by means of historical analysis. Such an analysis aims at identifying the contradictions that need to be resolved and charting the zone of proximal development that needs to be traversed in order to move beyond the existing contradictions. This calls for effective ways of articulating and depicting the historically possible zone of proximal development.

Haavisto (2002) studied expansive learning efforts of a Finnish district court implementing locally the general guidelines of a nationwide court reform. She followed, recorded and analyzed three civil trials before the reform and another three after the reform. The Finnish court proceedings were traditionally very formal and non-interactive, based on lengthy written briefs read aloud in front of the judge. At the same time, the judges traditionally allowed the attorneys to decide what issues to cover and the timeframe for the exchange of briefs. In other words, the old proceedings were both formal and unrestricted, which often meant multiple hearings extended over a period of several months. The new legislation aimed at proceedings based on informal oral discussion yet actively controlled and guided by the presiding judge. The aim is for a compact process addressing all points of view in the one hearing. This transformation is intertwined with a transition from the traditional notion of justice as material truth to the idea of negotiated justice and pragmatic compromise.

In Haavisto's study, expansive learning took place by means of modest incremental steps led by 'spearheads' such as trials in which the clients (not attorneys) began to take active initiatives and proceedings in which the judges intervened actively to promote settlement between the parties. In these spearheads, new ways of talking emerged, such as instructional talk of the judge directed at lay clients taking initiatives in the hearing. Simultaneously, new tensions also emerged, such as the tension between increased client initiatives made possible by the informality and the increased emphasis on active control and leadership on the part of the judge.

### EXPANSIVE LEARNING AS CYCLIC PROGRESSION OF LEARNING ACTIONS

The expansive cycle of learning actions depicted in Figure 7.2 has been used as framework of interpretation in studies of relatively large-scale and lengthy processes of transformation. Seppänen (2004), for example, used the expansive cycle to interpret the significant steps in the learning of two farms in transition from traditional to organic farming over a period of a decade. Nilsson (2003) analyzed three successive expansive cycles in the integration of preschool, leisure-time center and elementary school in Sweden, the first cycle spanning from 1981 to 1999, the second from 1998 to 2000, and the third from 2000 on, being incomplete at the time of the analysis. Similarly, Foot (2001) analyzed the development of a monitoring network of ethnic conflicts (EAWARN) over a period of several years, identifying two successive cycles. The cycle model forces the analyst to make sense of events in terms of epistemic learning actions. This often leads to important insights, as exemplified by Foot (2001, p. 74):

Viewing the two cycles next to each other reveals that, chronologically, there is a partial overlap between them. As spiraling cycles, the second is contingent upon the first, though not strictly successive to it. The introduction of the indicator model [a new tool for the network] occurred in the evaluation phase of the first cycle and in the analyzing phase of the second cycle. In other words, the introduction of the indicator model was an action with dual meaning. On the one hand, it was an action of evaluation and consolidation. On the other hand, it was an action that led to the modeling of a new form of activity.

What initially looks like an expansive transformation may in the end become something else. In analyzing the development of a nursing home over 25 years, Mäkitalo (2005, p. 179) concluded that at a certain point the cycle began to narrow. While this is certainly plausible, it may also be problematic to use the cycle to cover excessively long periods. In other words, it is important to articulate and argue the criteria of the starting and end points of a cycle. The logic of the expansive cycle is such that a new cycle is assumed to begin when an existing, relatively stable pattern of activity begins to be questioned. Correspondingly, the cycle ends when a new pattern of activity has become consolidated and relatively stable. It might be argued that a narrowing cycle emerges if one interprets the questioning and increasingly aggravated contradictions typical to the beginning of a new cycle merely as end phases of the previous cycle.



On the other hand, it is indeed to be expected that many transformations in activity systems are not predominantly expansive. Mäkitalo's (2005, p. 99) tentative distinction between expansive, narrowing, repetitive, and divided cycles is therefore warranted and needs to be developed further in empirical analyses.

Large-scale cycles involve numerous smaller cycles of learning actions. Such a smaller cycle may take place within a few days or even hours of intensive collaborative analysis and problem solving. Careful investigation may reveal a rich texture of learning actions within such temporally short efforts. But can such a miniature cycle be called expansive? This question was addressed in a study focused on miniature cycles of learning actions in team meetings of an industrial plant (Engeström, 1999b):

Miniature cycles of innovative learning should be regarded as *potentially* expansive. A large-scale expansive cycle of organizational transformation always consists of small cycles of innovative learning. However, the appearance of small-scale cycles of innovative learning does not in itself guarantee that there is an expansive cycle going on. Small cycles may remain isolated events, and the overall cycle of organizational development may become stagnant, regressive, or even fall apart. The occurrence of a full-fledged expansive cycle is not common, and it typically requires concentrated effort and deliberate interventions. With these reservations in mind, the expansive learning cycle and its embedded actions may be used as a framework for analyzing small-scale innovative learning processes (Engeström, 1999b, p. 385).

In the study of the team meetings, expansive learning actions did not strictly follow the order presented in the ideal-typical cyclic model of Figure 7.2. For instance, in one of the meetings modeling the new solution was attempted at the very beginning, and later completed after actions of analysis and questioning. Among the expansive actions, there were also some non-expansive learning actions, such as reinforcing the existing practice (Engeström, 1999b, pp. 390–391). The entire miniature cycles were socially distributed accomplishments. Thus, in one of the meetings, seven successive expansive learning actions were initiated by six different participants (Engeström, 1999b, p. 401). A larger sample of potentially expansive miniature cycles of learning actions was subsequently analyzed by Lambert (1999).

The Change Laboratory interventions (Engeström et al., 1996, Engeström, 2007c) occupy an intermediate position between multi-year macro cycles and miniature cycles that may last a couple of hours. A Change Laboratory intervention

often takes place as a series of six to twelve weekly meetings of a pilot unit of an organization, plus one or two follow-up meetings several months later. This kind of intervention attempts to accelerate and intensify the expansive learning process by introducing successive tasks that require specific expansive learning actions. Expansive learning cycles and learning actions generated with the help of Change Laboratory interventions have been analyzed by Engeström (2001a), Ahonen and Virkkunen (2003), Virkkunen and Ahonen (in press), Pihlaja (2005), and Hyrkkänen (2007), among others. The studies show that the learning actions taken by participants do not necessarily correspond to the intentions behind the tasks assigned by the interventionist. Time and again, the participants take over the leading role in the intervention process, rejecting and reformulating tasks and performing actions that change the plans of the interventionist. This dialectic between planned and actually realized courses of expansive learning is of great importance in future research.

## EXPANSIVE LEARNING AS BOUNDARY CROSSING AND NETWORK BUILDING

Important processes of innovation and learning are increasingly occurring in collaborative constellations and networks of multiple activity systems. In studies of expansive learning, this was first taken up in a paper that put forward boundary crossing as a serious theoretical concept (Engeström et al., 1995). Boundary crossing was characterized as 'horizontal expertise where practitioners must move across boundaries to seek and give help, to find information and tools wherever they happen to be available' (p. 332).

Lambert (1999) examined boundary crossing in the field of vocational teacher education. Traditional teacher education can take standard practices of classroom teaching for granted. The culmination of Finnish vocational teacher education has been the 'proof lesson' given by the student teacher to demonstrate her ability to teach in practice. In such a model, the new challenges and development efforts of the work organizations that eventually employ the students of vocational education are all but completely absent. Teacher education is an encapsulated world of its own.

In her experimental program, Lambert replaced the proof lessons with a boundary-crossing arena called Learning Studio. The student teachers in the program were already working as teachers in vocational education in the field of health care and social welfare; they attended the teacher education program in order to acquire a full formal teacher qualification. The student teachers were asked to

conduct development projects in the workplaces, aimed at improving their curricula and teaching practices. Each student teacher presented a project report in the Learning Studio. The participants of the studio included (a) representatives of the teacher education institute, (b) teachers and students of the vocational training school in which the student teacher worked, and (c) representatives of one or more employer organizations (in this case, health care and social welfare service delivery organizations) for which the specific project was relevant. In the studio session, the participants discussed the student teacher's project as a possible shared innovation. In other words, the studio sessions required discursive crossing of multiple boundaries. This led to reciprocal exchange and adoption of ideas driven by a shared, potentially expansive object – a process called 'developmental transfer'.

Lambert's analysis of 11 Learning Studios as processes of expansive learning and boundary crossing led to findings that successful boundary crossing and developmental transfer were largely dependent on the employment of appropriate tools. In particular, 'boundary objects' (Star and Griesemer, 1989), such as forms, knowledge repositories, and graphic models, played an important role in the expansion of the shared object.

The idea of developmental transfer as an outcome of boundary crossing in an expansive learning process has been developed further in a number of subsequent studies (Tuomi-Gröhn and Engeström, 2003; Konkola et al., 2007). In these, the focus has moved to the practice periods or internships of students of vocational and professional education. The practice periods or internships are jointly redesigned as development projects aimed at meeting real needs and challenges in workplaces. The student or group of students may act as a crucial change agent, carrying, translating and helping to implement new ideas between the educational institution and the workplace.

The relatively general idea of boundary crossing was further developed in a series of studies of expansive learning in the medical care of chronic patients with multiple illnesses, using multiple care providers (Engeström, 2001a, 2001b, 2003; Engeström et al., 2003, Saaren-Seppälä, 2004; Kerosuo, 2006). The learning challenge in such fields of activity is to acquire a new, negotiated way of working in which patients and practitioners from different caregiver organizations will collaboratively plan and monitor the patient's trajectory of care, taking joint responsibility for its overall progress. The key concept developed in these studies is negotiated knotworking.

The notion of knot refers to rapidly pulsating, distributed and partially improvised orchestration of

collaborative performance between otherwise loosely connected actors and activity systems. (...) Knotworking is characterized by a pulsating movement of tying, untying and retying together otherwise separate threads of activity. The tying and dissolution of a knot of collaborative work is not reducible to any specific individual or fixed organizational entity as the center of control. The center does not hold. The locus of initiative changes from moment to moment within a knotworking sequence. Thus, knotworking cannot be adequately analyzed from the point of view of an assumed center of coordination and control, or as an additive sum of the separate perspectives of individuals or institutions contributing to it. The unstable knot itself needs to be made the focus of analysis (Engeström et al., 1999, pp. 346–347).

Knotworking is the emerging mode of collaboration in work settings that move toward co-configuration, a form of production aimed at the creation of customer-intelligent products or services which adapt to the changing needs of the user and have very long life trajectories, requiring that the customer becomes a real partner with the producer (Victor and Boynton, 1998; Engeström, 2004b). In the health care studies the expansive learning process led to the creation of new tools for negotiated care. The key tool was called 'care agreement'. It was complemented by the care map and the care calendar. Together these were aimed at generating a new instrumentality for negotiated knotworking (Kerosuo and Engeström, 2003; Engeström, Pasanen et al., 2005).

The concept of knotworking has been found useful in recent studies on learning in such diverse contexts as university–school partnerships (Fenwick, 2006a), knowledge sharing among globally distributed anti-doping experts (Kazlauskas and Crawford, 2007), and collaboration between speech therapists and school staff (Martin, 2008).

Boundary crossing has also been analyzed in activity-theoretical studies of technological innovations. In a study of the implementation of a complex technological device in clinical use, Hasu and Engeström (2000) observed that bridging the gap between the developers and users may require new types of software tools: 'software agents must operate as boundary-crossing agents that facilitate interaction and mutual intelligibility between the perspectives' (p. 86).

Learning in organizational networks is commonly depicted as horizontal movement of information between organizational units. This view easily forgets that networks are also hierarchies. In other words, learning is also vertical movement and boundary crossing between different organizational levels. This aspect of expansive learning was the focus of Toivaiainen's (2003) study.

Toivainen analyzed learning in a small-firm network, initially at four levels: the network-ideological, the project, the production, and the worker levels. The longitudinal study revealed that the different levels were activated one by one as the expansive cycle progressed. The interplay between the levels eventually led to the formation of an entirely new level of functioning and learning located between the project level and the production level – a partnership between several firms in the original network.

(...) the emergence of the fifth level of learning, 'the partnership level', was decisive for the dynamics of learning across the levels. It was an intermediate level that was needed, above all, to bridge the gap between the visions and ideals of networking and the practices of production across the firms. On the threshold of the new cycle of expansive learning, the major learning challenge pointed at the partnership level and its capability of encouraging learning-from-below – transforming the creative actions of production units into contributions to the entire network's learning (Toivainen, 2007, p. 353).

## FORMATIVE INTERVENTIONS

Vygotsky's methodological principle of double stimulation leads to a concept of formative interventions which are radically different from the linear notion of intervention embedded in the traditional idea of controlled experiment. The crucial differences may be condensed in three points (Engeström, 2008a).

- (1) *Starting point*: In linear interventions, the contents and goals of the intervention are known ahead of time by the researchers. In formative interventions, the subjects (whether children or adult practitioners, or both) face a problematic and contradictory object which they analyze and expand by constructing a novel concept, the contents of which are not known ahead of time to the researchers.
- (2) *Process*: In linear interventions, the subjects, typically teachers and students in school, are expected to execute the intervention without resistance. Difficulties of execution are interpreted as weaknesses in the design that are to be corrected by refining the design. In formative interventions, the contents and course of the intervention are subject to negotiation and the shape of the intervention is eventually up to the subjects. Double stimulation as the core mechanism implies that the subjects gain agency and take charge of the process.

- (3) *Outcome*: In linear interventions, the aim is to control all the variables and to achieve a standardized solution module, typically a new learning environment, that will reliably generate the same desired outcomes when transferred and implemented in new settings. In formative interventions, the aim is to generate new concepts that may be used in other settings as frames for the design on locally appropriate new solutions. A key outcome of formative interventions is agency among the participants.

In the mid-1990s, University of Helsinki researchers developed a new intervention toolkit under the generic name of *Change Laboratory* (Engeström, Virkkunen et al., 1996). Variations of this toolkit have been used in a large number of intervention studies in settings ranging from post offices and factories to schools, hospitals and newsrooms. The Change Laboratory serves as a microcosm in which potential new ways of working can be experienced and experimented with (Engeström, 1987, pp. 277–278).

A Change Laboratory is typically conducted in an activity system that is facing a major transformation. This is often a relatively independent pilot unit in a large organization. Working practitioners and managers of the unit, together with a small group of interventionist-researchers, conduct five to ten successive Change Laboratory sessions, often with follow-up sessions after some months. When feasible, customers or patients are invited to join Change Laboratory sessions in which their particular cases are analyzed in detail. Change Laboratories are also conducted as boundary crossing laboratories with representatives from two or more activity systems engaged in collaboration or partnership.

The Change Laboratory is built on ethnographic data from the activity setting in which it is conducted. Critical incidents, troubles and problems in the work practice are recorded and brought into Change Laboratory sessions to serve as *first stimuli*. This 'mirror material' is used to stimulate involvement, analysis and collaborative design efforts among the participants.

To facilitate analysis and resolution of the problems, interventionists typically introduce conceptual tools such as the triangular models of activity systems (see Figure 7.1) as *second stimulus*. Commonly the conceptual models offered by the interventionists are replaced or combined with mediating conceptualizations or models formulated by the participants.

The participants are challenged to use the mediating second stimulus as an instrument in the design of a *new concept* for the activity they are trying to transform. Implementation of the designed new solution is usually initiated while

the Change Laboratory sessions are still running, in the form of pilot experiments. The implementation typically leads to a richer and more articulated concept.

In the analysis and design, the participants are asked to move between the past, the present, and the future. This means that historical origins of the current problems are dug up and modeled, and the ideas toward a future concept are played with in anticipatory simulations such as role play. The laboratory sessions themselves are videotaped for analysis and use as stimuli for reflection. The procedure allows for the collection of rich longitudinal data on the actions and interactions involved in deliberately induced cycles of expansive learning.

While numerous studies and dissertations (many discussed here) have been published based on data collected in Change Laboratory interventions, relatively little research has as yet been done on the methodology as such (see, however, Engeström, 2000, 2007c; Cole and Engeström, 2007; Sannino, 2008b; Virkkunen, 2004; Virkkunen and Ahonen, in press). Pihlaja (2005) describes and analyzes the very first Change Laboratory process conducted in the Finnish postal services. Teräs (2007) analyzes a Change Laboratory process (called Culture Laboratory) aimed at the empowerment of immigrant students in a vocational training college. Ahonen (2008) gives a comprehensive analysis of a Change Laboratory process (called Competence Laboratory) aimed at proactive development of the competences of the employees and teams of a telecommunications company. Bodrozic (2008) proposes a broad historical perspective for the analysis and future shaping of post-industrial interventions.

## FUTURE CHALLENGES

The most important outcome of expansive learning is agency – participants' ability and will to shape their activity systems. A major challenge for the study of expansive learning is to conceptualize and characterize empirically the new forms of agency involved in expansive processes (see Edwards, 2009; Nummijoki and Engeström, 2009; Sannino, 2008b; Virkkunen, 2006a, 2006b; Yamazumi, 2009). In formative Change Laboratory interventions, I have tentatively identified the following five interconnected forms of participants' emerging agency which seem to be quite specific and characteristic to this type of interventions: (1) resisting the interventionist or the management, (2) explicating new possibilities or potentials in the activity, (3) envisioning new patterns or models of the activity, (4) committing to concrete actions aimed at changing the activity, (5) taking consequential

actions to change the activity (Engeström, 2008a). In Change Laboratory processes, the consequential change actions are mostly taken after and in between the laboratory sessions. To record and reflect on such actions, various kinds of follow-up data are collected and specific follow-up sessions are included in the longitudinal intervention process.

Expansive learning is a process of concept formation. This framework suggests that the very idea of concepts needs to be redefined. As Hall and Greeno (2008, p. 213) point out, 'concepts and their meanings develop and evolve in settings of practice and are maintained in practices because they are useful in conducting the community's activities.' In this perspective, concepts are consequential for the lives of those who work with them. Such concepts are embodied, embedded and distributed in and across human activity systems equipped with multi-layered and multi-modal representational infrastructures or instrumentalities (Engeström, 2007a). Of particular interest are 'possibility concepts' (Engeström, 2007b) and 'perspectival concepts' (Engeström, Pasanen et al., 2005) which explicate time-bound collective intentions or visions of future development and change.

In a recent series of studies on expansive learning in organizations moving toward co-configuration work (Engeström, 2007a), a recurring gap was observed between the highly motivated modeling phase in which participants designed a new concept for their work, and the implementation phase in which numerous obstacles and persistent inertia tended to take over. This gap was momentarily overcome in episodes in which the participants put themselves into imagined, simulated and real situations which required personal engagement in actions with material objects and artifacts (including other human beings) that followed the logic of the anticipated or designed future model of the activity.

The concept of experiencing, as put forward by Vasilyuk (1988), seems promising as a bridge between design and implementation. According to Vasilyuk (1988, p. 10), experiencing is 'particular internal work by means of which a person overcomes and conquers a crisis, restores lost spiritual equilibrium and resurrects the lost meaning of existence.' In other words, Vasilyuk defines experiencing as the working out of contradictions human beings encounter in maintaining their activities.

If one had to use one word only to define the nature of such situations one would have to say that they are situations of *impossibility*. Impossibility of what? Impossibility of living, of realizing the *internal necessities* of life. The struggle against

impossibility, the struggle to realize internal necessities – that is experiencing. Experiencing is a repair of a ‘disruption’ of life, a work of restoration, proceeding as it were at right angles to the line of actualization of life. If the psychological theory of activity studies, figuratively speaking, the way in which a human being travels life’s road, then the theory of experiencing studies the way in which he or she falls and rises again to continue the journey (Vasilyuk, 1988, p. 32).

Practitioners facing major transformations in their work activities are indeed working out contradictions and struggling to overcome the impossible. ‘The process of experiencing does not lead the participant directly to realize his or her needs. It leads to restoring the psychological possibilities to carry on the activity required for the realization of these needs. In other words, experiencing may be seen as a process through which individual disposition to act is prepared’ (Sannino, 2008b, p. 241). Interventions such as Change Laboratories aimed at expansive learning may be fruitfully analyzed as ‘discourse- and activity-centered processes of experiencing’ (Sannino, 2008b, p. 253). In future intervention studies of expansive learning, participants’ autobiographical accounts of critical conflicts may be used as an important type of ‘mirror material’ for experiencing (Sannino, 2008a).

Perhaps the biggest challenge for future studies and theorizing in expansive learning comes from the emergence of what is commonly characterized as social production or peer production (Benkler, 2006). In social production or peer production, activities take the shape of expansive swarming and multi-directional pulsation, with emphasis on sideways transitions and boundary-crossing. Recently I have suggested the notion of wildfire activities to point out that there are activities that have important characteristics similar to those of peer production but predate Internet and take place mainly outside the sphere of digital virtuality (Engeström, 2009). Learning in wildfire activities is learning by swarming that crosses boundaries and ties knots between actors operating in fractured and often poorly charted terrains. These characteristics call for a reworking of Vygotsky’s (1978) foundational concept of the zone of proximal development, and of the collective and expansive redefinition of this concept (Engeström, 1987).

The ultimate test of any learning theory is how it helps us to generate learning that penetrates and grasps pressing issues the humankind is facing today and tomorrow. The theory of expansive learning currently expands its analysis both up and down, outward and inward. Moving up and outward, it tackles learning in fields or networks of interconnected activity systems with their partially

shared and often contested objects. Moving down and inward, it tackles issues of subjectivity, experiencing, personal sense, emotion, embodiment, identity, and moral commitment. The two directions may seem incompatible. Indeed, there is a risk that the theory is split into the study of collective activity systems, organizations and history on the one hand and subjects, actions and situations on the other hand. This is exactly the kind of split the founders of activity theory set out to overcome. To bridge and integrate the two directions, serious theoretical and empirical efforts are needed.

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